

XV. *Notes of the habits of a Lepidopterous Insect parasitic on Fulgora candelaria.* By J. C. BOWRING, Esq. *With a description of the species.* By J. O. WESTWOOD, M.A., F.L.S., Pres. Ent. Soc.

[Read 2nd August, 1876.]

It is now twenty-six years since Mr. J. C. Bowring brought to England from Hong Kong specimens of a "curious Coccus-like insect, parasitic on *Fulgora candelaria*," which he deposited in the British Museum. On his return to China he endeavoured to rear the insect to the perfect state, which he succeeded in doing in June, 1850, the parasite in question proving to be the larva of a Lepidopterous insect. On the discovery being made, he forwarded further specimens to England, accompanied by the following notes:—

"No. 1 is a young larva. These are found from the size of a pin's head to fully half an inch in length attached to the dorsal surface of the *Fulgora*, there being rarely more than one parasite on a *Fulgora*, although in one instance I found three on a single specimen. When young they are destitute of the cottony covering which gives them so great a resemblance to several species of *Cocci*; but as they grow larger this makes its appearance, until they are at length densely covered with it. Arrived at this stage, they drop off from the *Fulgoræ*, and retire to some safe place where they may undergo their transformation to the pupa state. (No. 2.) Although I have not been able to discover in what way the insect spins its coating of cotton into a cocoon, it is evident that it does so, forming a comfortable-looking compact nidus, lined internally with strong and stiff material. (See No. 3, a cocoon cut open and the pupa No. 4 extracted.) The period during which the insect remains in the pupa state is very variable; in one instance it was only nine days—in another upwards of twelve months; the latter case was during our cool season, the former last month (June, 1850).

On attaining the perfect state (No. 6), the insect makes it escape from its nidus by an opening at one end, leaving the pupa case protruding therefrom about half its length (see No. 5), like the *Oiketicæ*. The six specimens above mentioned show the insect in all its principal stages; the eggs I have not yet seen. My breeding-cage is a large one, with gauze sides and gauze top, and in this I keep my *Fulgoræ*, which require to be kept constantly supplied with fresh branches of trees on which they feed, by thrusting their rostrum into the bark. As before mentioned, the parasites, when full grown, drop from the insect on which they have been living, and I find that they generally creep to the top of the cage, remaining back downwards. For the first day or two I can distinguish the naked underside of the insect against the gauze, but its coating of cotton grows thicker and thicker until the larva disappears totally enveloped in its warm nidus. My first specimen came out in March. On taking my morning look at the cage, I observed with pleasure that one of my little parasites had attained the perfect state; for there were the cocoon and pupa case before me. I searched carefully for the imago, which I fully expected would prove a *Curculio*, but I found nothing but a small moth already dead. This was by no means satisfactory, as the beetle, if it were one, might have eaten its way through the gauze, and the moth might have been brought in with the fresh leaves the previous day. I therefore took another specimen, which had just assumed the pupa state, and enclosed it in a small tin box, which shut closely, and whose lid was pierced with a number of minute holes to admit the air. There could be no mistake now, and night and morning I examined the box. On the 9th day I was delighted at observing that the imago had come forth. This time there could be no doubt, for a beautiful little moth, already dead, was lying by the cocoon, similar in every respect to the one I had formerly found in the cage. Nos. 5 and 6 are the cocoon and imago in question. I have to request that this series of specimens may be presented to the National Museum after being exhibited to the members of the Society. The larvæ themselves are not common; the specimen labelled 2 I consider particularly interesting. I had it in my box for some time, when one day a number of *Hymenoptera* issued from it, parasites on a parasite.

I was unable, to my regret, to capture any of these, for they were so small that they escaped through the gauze covering of my breeding-cage, and I did not perceive them until it was too late."

The special interest attached to this insect consists, first, in its being a *Lepidopterous* parasite, and, second, on its being parasitic upon so remarkable an insect as the *Fulgora candalaria*. Mr. Bowring, it will be noticed, leaves untouched the nature of the parasitism of this species; but it is evident from what he says that the *Fulgora* are not destroyed by the parasite. The following, in the absence of positive information, may probably be assumed to be the *modus operandi* of the insect. The *Fulgora* belongs to an order of insects (the *Homoptera*), of which many of the species secrete a greater or less quantity of white *waxy* matter, sometimes completely enveloping the body and sometimes forming elongated flakes, even several inches in length (*e. g.*, *Lystra auricoma*, Burmeister, Gen. Ins., pl. 20).

Mr. Bowring states that his parasites were covered with a *cottony* coat, which gives them a resemblance to a *Coccus*. Now this "cottony" covering was doubtless formed of the wax secreted by the *Fulgora*; and I have, moreover, not the least doubt that it was upon the same waxy material that the parasite fed, without in any way injuring the *Fulgora*. That the larvæ of certain *Lepidopterous* insects feed upon various animal matters we know well. Hair, wool, fur, bones, &c. are all eaten by the larvæ of different moths, and the moth "fretting a garment" is a well-known symbol. We know, moreover, that there are two or three different moths belonging to the genus *Galleria*, of which the caterpillars feed on wax; and although they are not immediately related to the present parasite in the perfect state, they afford, I think, sufficient grounds for our believing that it is upon the waxy secretion of the *Fulgora* that this parasite subsists.

The accompanying figures are drawn from Mr. Bowring's specimens, above described, in the British Museum, and others subsequently forwarded by that gentleman, now in the Hopeian Collection at Oxford, by whom also the manuscript name, subsequently adopted in this paper, was proposed, no description of the insect having hitherto appeared, so far as I am aware.

EPIPYROPS.*

Genus novum, e familiâ *Arctiidarum*.

IMAGO.—Corpus parvum.

Caput mediocre, palpis minimis; oculi laterales subglobosi. Antennæ mediocre, graciles, articulis circiter 18, 16 ultimis longè biramosis, ramis gracilibus ciliatis. Thorax crassus, brevis. Tegulæ reniformes. Alæ satis magnæ, anticæ trigono-ovales, venâ costali simplici; venâ postcostali quasi 4-ramosâ, ramo 5to (fig. 15, *b* 5, ramum supero-discoidalem simulante), ramo supero-discoidali (*b* 5*) inferum simulante, ramoque infero-discoidali (*c* 3*) ramum 4um medianum (ut in Papilionibus veris) simulante; alæ posticæ ovales, abdominis longitudinem superantes; venâ postcostali (fig. 17 *b*) bifidâ, venâ medianâ quasi 4-ramosâ, venâ discoidali (fig. 17, *c* 3*) ramum quartum medianum simulante, basi ejus (*z*) in cellulam discoidalem extensâ, parteque ejus mediâ (*x*) cellulam discoidalem claudente. Pedes graciles, tibiæ anticæ (fig. 18) et mediæ (fig. 19) absque calcari in medio marginis antici; spinisque duabus minutis apicalibus.

LARVA.—Obesa, nuda, hand spinosa vel tuberculata, pedibus 6 pectoralibus, 8 ventralibus (2 analibus?). Mandibulæ apice bidentatæ; maxillæ palpo minimo biarticulato instructæ. Labium magnum, tuberculo filum emittente. Oculi laterales utrinque ex ocellis circiter 7 formati. Antennæ minutæ (fig. 4). In folliculo cereo supra *Fulguræ candellaricæ* dorsum parasiticæ degens, ceramque? manducans.

PUPA.—Brevis, crassa, in cellulâ coriaceâ intus folliculum larvæ quiescens; dorso lævi, nec spinosâ, per partem superam ruptam folliculi pro transformatione ultimâ ex parte protrudens.

Epipyrops anomala. (Pl. VII.)

Brunnea, albo-squamosa, tegulis incisurisque abdominalibus albo-hirtis; alis anticis brunneis, albo parum irroratis; costâ serie guttarum albidarum notatâ, apicali majori, maculâque indistinctâ albidâ ad apicem cellulæ discoidalis, cilio punctisque parvis marginalibus albis; alis posticis fuscis, cilia alba.

Long. corp. 4; expans. alar. antic. 14.

Habitat in Chinâ. Hong Kong (Bowring).

In Mus. Britann. et Hopeiano Oxoniæ.

* This name is given in allusion to the insect being found upon *Fulguræ candellaricæ* (*Pyrops*) *candellaricæ*.

The general appearance of this moth approaches nearest to the *Arctiidae*; its habits are, however, far removed from those of any known species of that family. As a wax feeder it agrees with the *Galleriæ*, but its general character removes it far from that group. The *Euplocami* amongst the *Tineidæ*, which contains a number of sack-bearing species, have the antennæ bipectinated, but their general character is equally removed from that of *Epipyrops*. The sack-bearing habits of the *Psychides* may indicate a nearer approach to this insect, which has, however, very little of the habit of that group. The arrangement of the veins of the fore-wings is interesting, the median vein having apparently four branches, as in *Papilio*, and the postcostal vein has apparently only four branches, but the normal number of branches to these veins exists—namely, five branches to the postcostal, and three branches to the median, with two intermediate veins (or rather branches) which correspond with the upper discoidal vein of E. Doubleday (which I consider normally to belong to the postcostal system) (fig. 15, *b* 5*), and the lower discoidal of E. Doubleday (which I consider normally to belong—as here seen—to the median system) (fig. 15, *c* 3*).

DESCRIPTION OF PLATE VII.

- Fig. 1. The delicate exuvia cast by the young larva.
- Fig. 2. The full grown larva from the dried specimen, dorsal view.
- Fig. 3. The ventral surface of the same.
- Fig. 4. Front view of the head of the larva.
- Fig. 5. Parts of the mouth of the larva seen from below.
- Fig. 6. The waxy cocoon formed by the larva.
- Fig. 7. The same with the front part of the pupa protruded.
- Fig. 8. The same with the slit formed by the exit of the perfect insect.
- Fig. 8*a*. Head of the exuvia of the larva.
- Fig. 9. The pupa seen ventrally.
- Fig. 10. The same, dorsal view.
- Fig. 11. The perfect insect.
- Fig. 12. Head of ditto seen in front.
- Fig. 13. One of the tegulæ.
- Fig. 14. Fore-wing denuded of scales.
- Fig. 15. Characteristic portion of fore-wing: *a*, costal vein; *b*, postcostal vein, and its branches *b* 1, *b* 2, *b* 3, *b* 4, *b* 5, together with the supplementary branch (upper discoidal vein) *b* 5*; *c*, the median vein, with its branches *c* 1, *c* 2, *c* 3, and the supplementary branch (lower discoidal vein) *c* 3*; *y* and *z*, basal portions of the two supplementary branches within the discoidal cell; *d* and *e*, anal veins.
- Fig. 16. Hind-wing denuded of scales.
- Fig. 17. Characteristic part of hind-wing: *a*, costal vein; *b*, postcostal vein, with its two branches *b* 1 and *b* 2; *e*, median vein, with its branches *e* 1, *e* 2, *e* 3, and the supplementary branch *e* 3*, of which the basal portion *z* runs through the middle of the discoidal cell; its middle portion *x* is employed partially to close the discoidal cell; *d*, *e*, *f*, anal veins.
- Fig. 18. Fore leg.
- Fig. 19. Middle leg.